

# Synthesis of a Biological Spring

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November 23rd 2005



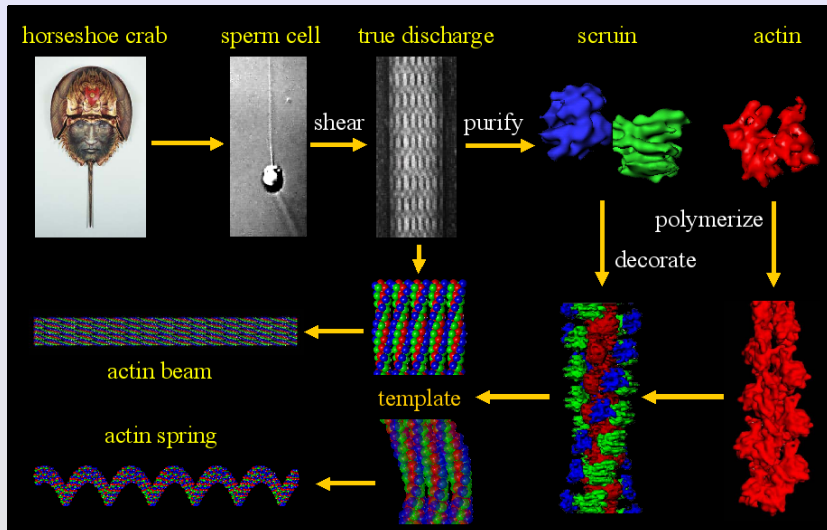
# Outline

- 1 Introduction
- 2 Length Characterization
- 3 Structural Analysis
- 4 Ongoing Work

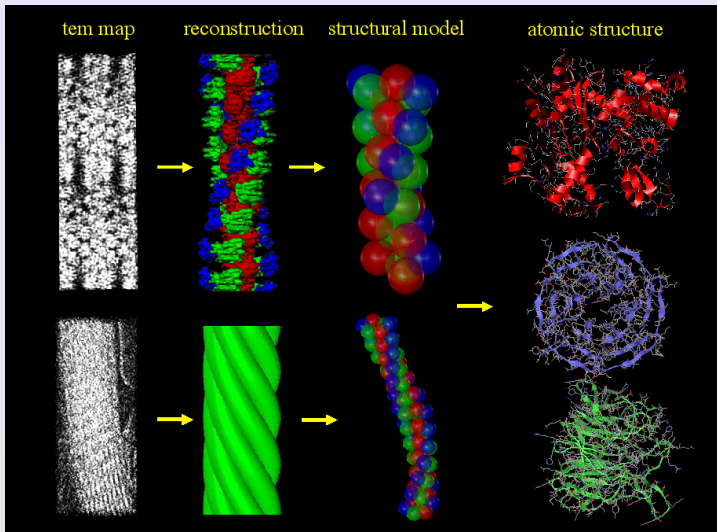
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# Design for Self Assembly



# Modeling the Acrosome



# Goals of the project

The three step plan to PhD happiness...

- 1 Develop structural models of the acrosomal process
- 2 Self-assemble actin and scruin into beams and springs
- 3 Develop a spring-based biological oscillator

# Outline

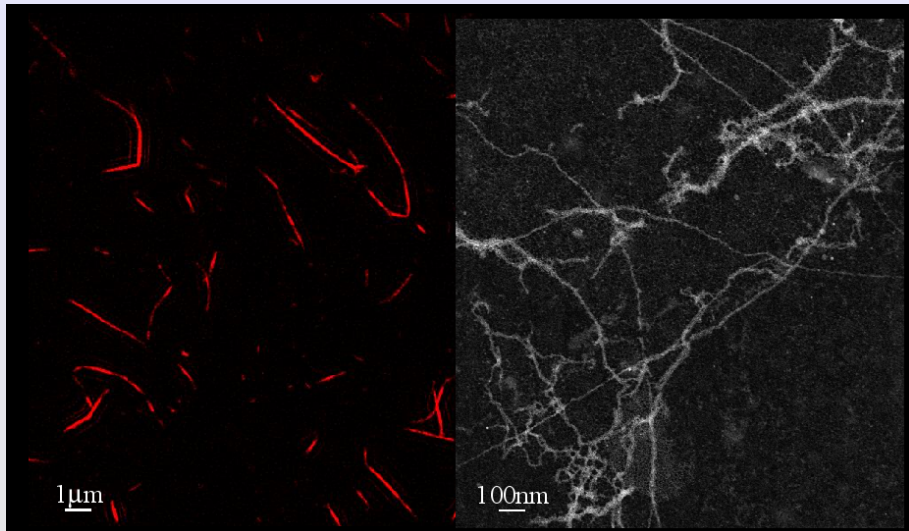
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# Experiment matrix

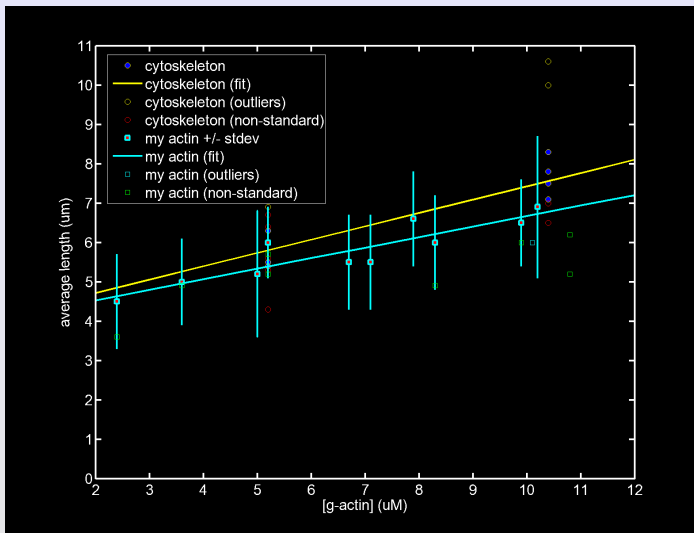
- 1 **Actin only**: polymerize monomeric (g-actin) in the presence of salt and magnesium
- 2 **Actin + TD**: preferentially nucleate off ends of TD seeds
- 3 **Actin + scruin**: decorate and crosslink actin into bundles and networks
- 4 **Actin + scruin + TD**: attempt to replicate TD structure



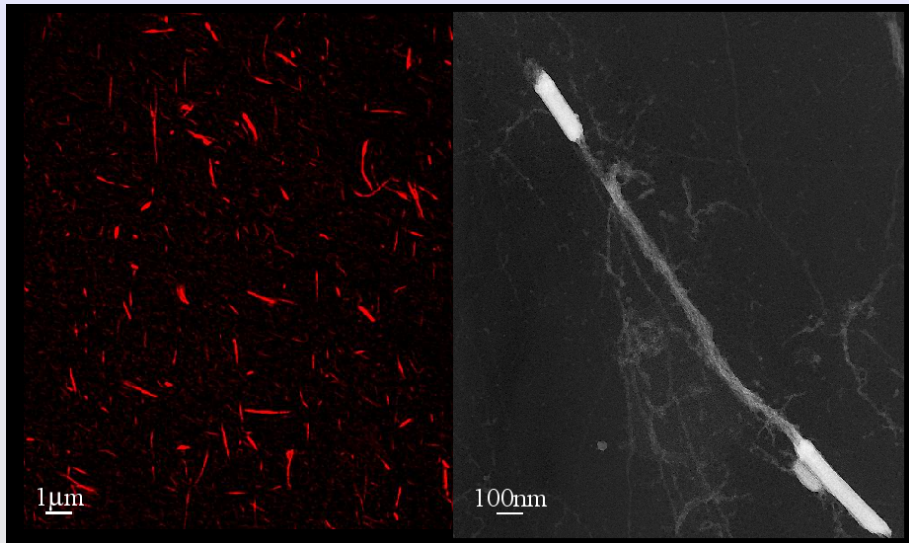
# Actin only images



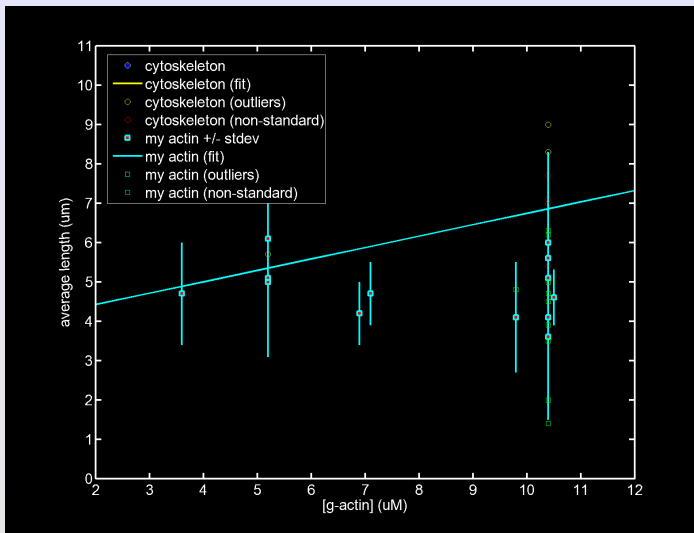
# Actin only lengths



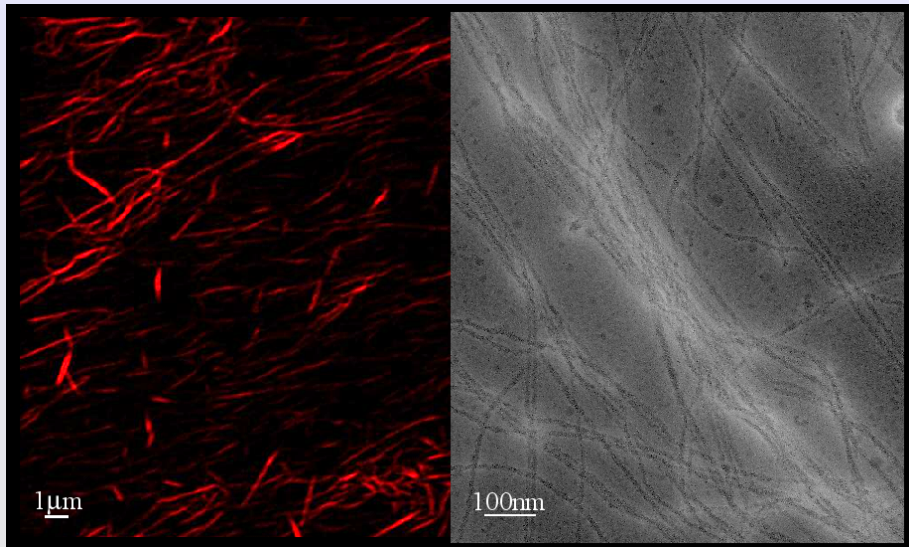
# Actin and true discharge images



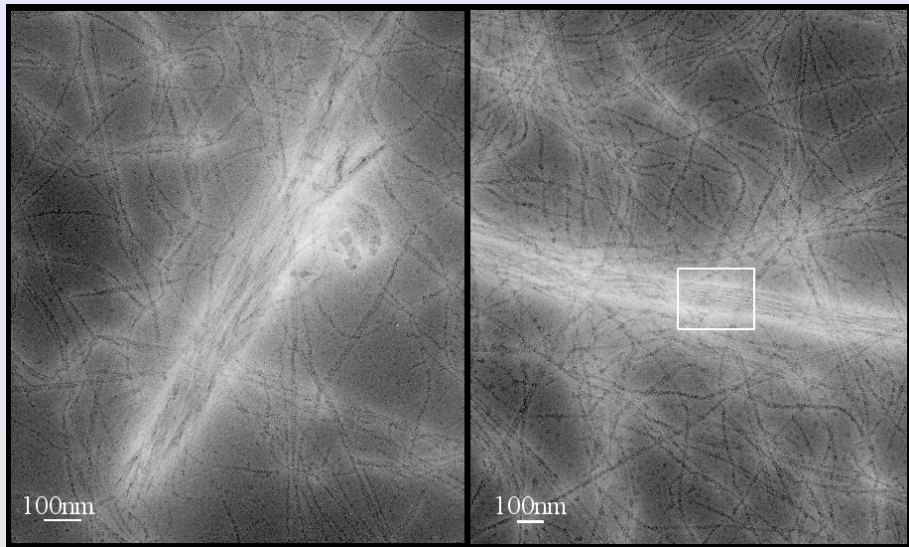
## Actin and true discharge lengths



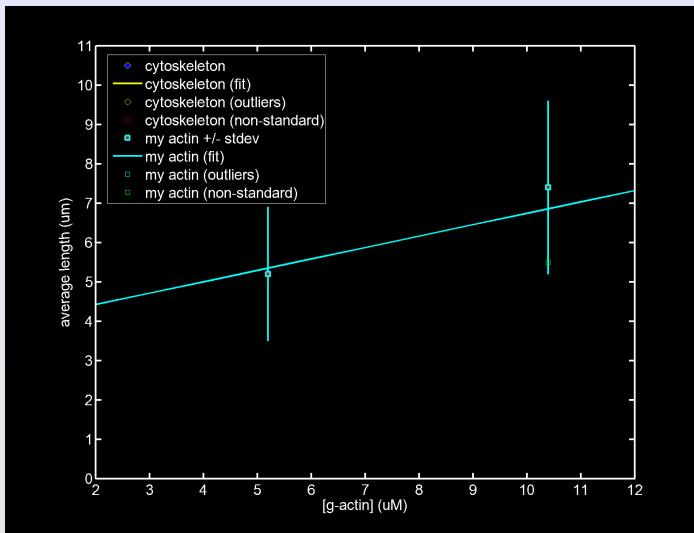
# Actin and scruiin images



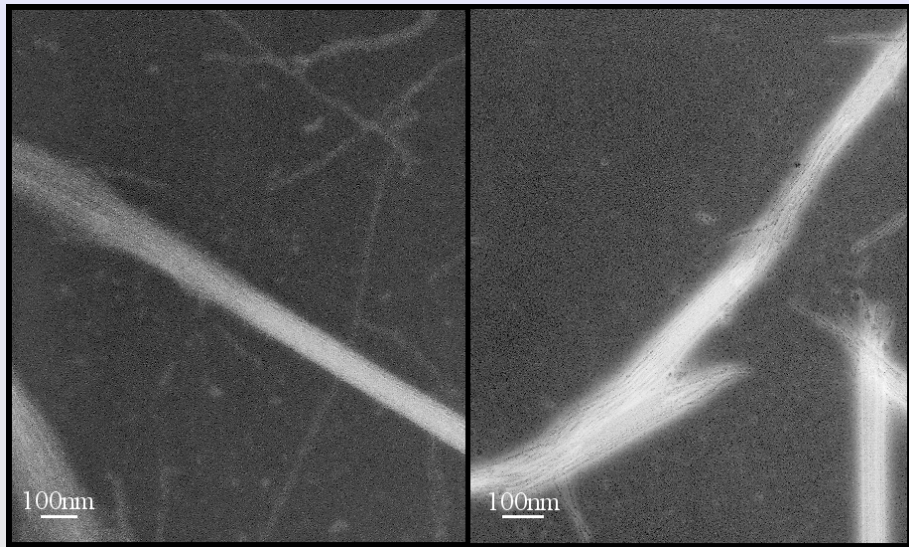
# Actin and scruiin images



# Actin and scruiin lengths



# Actin, scruiin and true discharge images

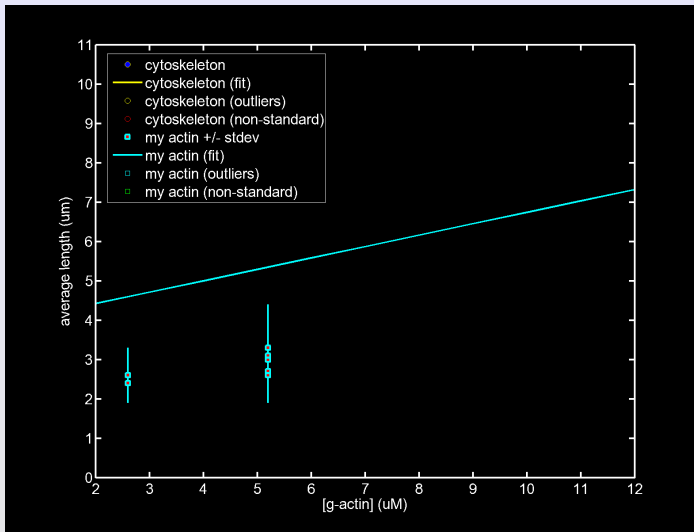




# Actin, scruiin and true discharge images



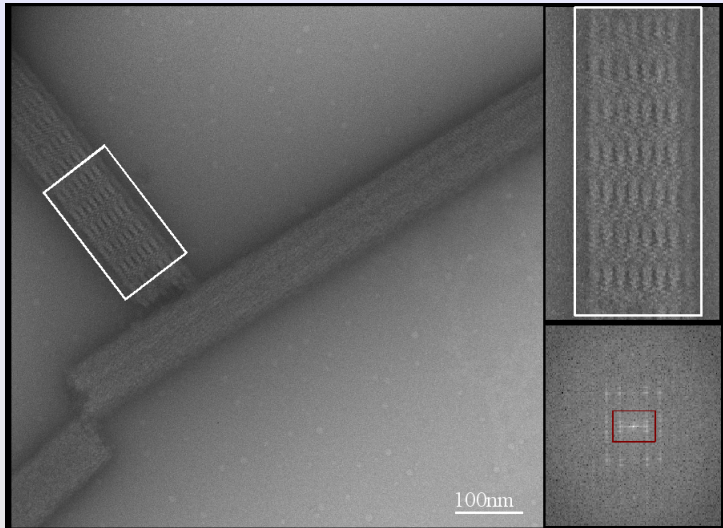
## Actin, scrutin and true discharge images



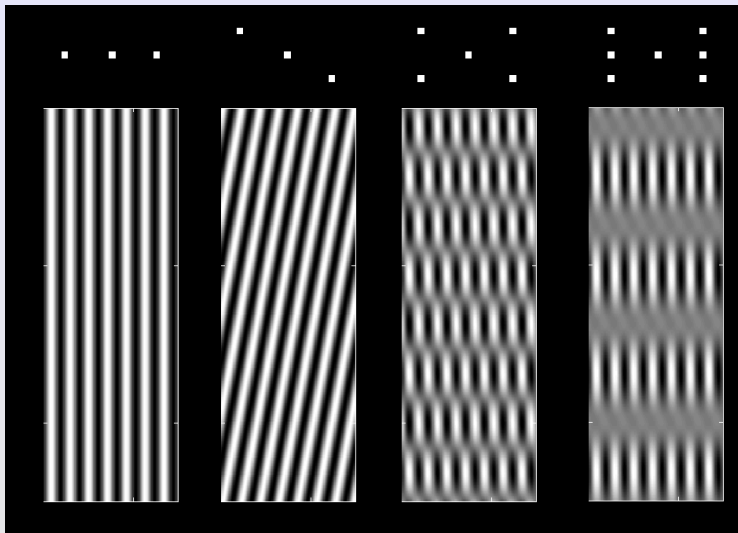
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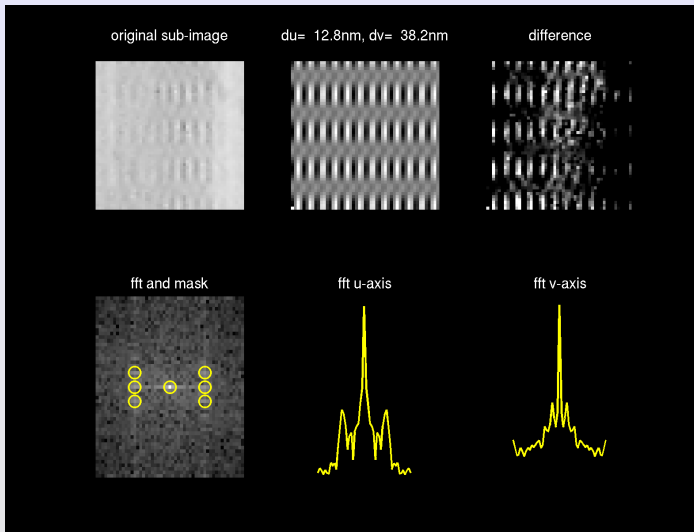
# True discharge under the cryo-tem



# Fourier space analysis



# Fitting the mask



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# Ongoing Work

## Things to do before graduating...

- Determine protocol for optimal growth
- Finalize structural models
- Use false discharge as a seed